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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

SCHULTE

U.S. APPLICATION NO (If known, see 37 CFR 1.5)

09/763356

INTERNATIONAL APPLICATION NO.
PCT/DE99/02557INTERNATIONAL FILING DATE
12 August 1999PRIORITY DATE CLAIMED
21 August 1998

TITLE OF INVENTION Scaffold Coupling Element with a Secure-Sitting Head Bolt

APPLICANT(S) FOR DO/EO/US Johannes-Albert MIEDEN

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).
4. ☐ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11 to 16 below concern document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

17. ☒ The following fees are submitted:
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :
Neither international preliminary examination fee (37 CFR 1.482)
nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO
and International Search Report not prepared by the EPO or JPO **\$1000.00**
International preliminary examination fee (37 CFR 1.482) not paid to
USPTO but International Search Report prepared by the EPO or JPO..... **\$860.00**
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but
international search fee (37 CFR 1.445(a)(2)) paid to USPTO **\$710.00**
International preliminary examination fee paid to USPTO (37 CFR 1.482)
but all claims did not satisfy provisions of PCT Article 33(1)-(4) **\$690.00**
International preliminary examination fee paid to USPTO (37 CFR 1.482)
and all claims satisfied provisions of PCT Article 33(1)-(4) **\$100.00**

CALCULATIONS PTO USE ONLY

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$ 860.00

Surcharge of **\$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(e)).

\$

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE
Total claims	- 20 =		X \$18.00
Independent claims	- 3 =		X \$80.00
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$270.00

\$

TOTAL OF ABOVE CALCULATIONS =

\$ 860.00

☒ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above
are reduced by 1/2.

\$ 430.00

SUBTOTAL =

\$ 430.00

Processing fee of **\$130.00** for furnishing the English translation later than ☐ 20 ☐ 30
months from the earliest claimed priority date (37 CFR 1.492(f)).

\$

TOTAL NATIONAL FEE =

\$ 430.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be
accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). **\$40.00** per property

\$

TOTAL FEES ENCLOSED =

\$ 430.00

Amount to be
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- a. ☒ A check in the amount of \$ 430.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any
overpayment to Deposit Account No. 02-3704. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

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SIGNATURE

James C. Wray

NAME

22,693

REGISTRATION NUMBER

21 February 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Johannes-Albert MIEDEN

Serial No.: To be assigned

Filed: February 21, 2001

For: SCAFFOLD COUPLING ELEMENT WITH A SECURE-SITTING HEAD BOLT

PRELIMINARY AMENDMENT

To the Director of the Patent and Trademark Office

Sir:

Before considering this application, kindly amend the application as follows:

In the Abstract:

Kindly consider the abstract on the cover sheet of published PCT Application WO 00/11284.

In the Specification:

Page 1, line 2, change "Description" to:

--BACKGROUND OF THE INVENTION--.

Page 3, before line 4, insert:

--SUMMARY OF THE INVENTION--.

Page 14, before line 5, insert:

--BRIEF DESCRIPTION OF THE DRAWINGS--.

Page 15, before line 11, insert:

--DETAILED DESCRIPTION--.

In the Claims:

Change "Patent Claims" to --I claim:--.

Claim 3, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 4, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 6, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 7, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 9, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 10, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 11, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 12, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 13, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 14, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 15, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

Claim 19, lines 1 and 2, change "one of the aforementioned claims" to --claim 1--.

REMARKS

Entry of the amendment and consideration and allowance of all claims are respectfully requested.

This preliminary amendment is necessary as it puts the application into proper form and renders clearer the invention being claimed.

Applicant's attorney further states that no new matter has been added to this application by this preliminary amendment.

Applicant has also provided an abstract in compliance with the rules.

Since applicant has merely amended the application to provide a better understanding of the invention and to additionally distinctly claim the invention, consideration and allowance of the claims are requested.

Respectfully,



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6/PARTS

09/763356
JC03 Rec'd PCT/PTO 21 FEB 2001

Scaffold Coupling Element With a Secure-Sitting Head Bolt

Description

The invention relates to a scaffold coupling element for tubular scaffold elements featuring two half braces which can be attached around the scaffold element and pivot around a bolt. A closing element tightens the braces and connects them with an additional brace or a pair of braces which hold a second scaffold element. The closing element consists of T-head bolts which are held by bell-shaped projecting parts limiting the pivotal motion of the T-heads. The shaft with the thread and the nut fit into the fork-shaped, free end piece of the corresponding brace which functions as a closing mechanism.

There have been many types of scaffold couplings for decades and every expert knows about their details. Known are scaffold couplings which connect right-angled scaffold elements, in other words which connect tubes that come together in a specific angle. For this purpose, the two coupling parts can be connected with a joint connector so that they can be turned towards each other. Finally, there are parallel fitting half braces which are connected lengthwise and which connect tubes that run vertically towards each other. Tube parts or bungs can be inserted in the connecting area to transmit the necessary pressure. All those scaffold couplings have in common that the closing elements consist of T-head bolts with a long threaded shaft and of a rounded T-head allowing a limited pivotal motion in

the surrounding bell or better, the projecting parts. For this purpose, the more common and newer versions of T-heads are bulging out on their sides as well as lengthwise and also feature completely round building elements. A nut will be fitted onto the threaded shaft to connect the two half braces effectively while tightening them around the corresponding tubes or scaffold elements. While tightening the nut, the people assembling the scaffold have to ensure that the nut transmits sufficient tightening pressure in order to effectively connect the scaffold elements. Experience showed that it cannot always be avoided that the end piece of the T-head bolt which forms the actual T-head can be slightly moved, turned or jammed inside the corresponding bell due to the tightening pressure of the nut. This movement or jamming can lead to the abrupt movement and loosening of the T-head when it suddenly slips back into the originally intended correct longitudinal position even when the repositioning itself is very minor. This can for example happen when sudden pressure is applied to the scaffold coupling or to the entire scaffold. Until now, it was believed that the cause for the crash of large scaffolds measuring more than 100 meters in height was related to nuts that weren't tightened enough and therefore caused loosening. The slight movement or turning motion of the T-head, however, can't be detected even if the assembly is conducted very carefully and thoroughly because the bells

holding the T-heads in the projecting parts are located on the opposite side of the scaffold and are not visible during assembly.

The task of the invention is therefore to create scaffold coupling elements with a secure-sitting head bolt.

The task is solved by the inventor by designing the T-head of the T-head bolts to fit the bell of the projecting parts and by adding contact surfaces to avoid jamming inside the bell or turning during the tightening of the bracing elements while allowing a pivotal motion.

Due to the special shape of the T-head, the T-head sits securely in the bell after inserting the shaft into the specially shaped opening of the bell. This ensures that the T-head cannot move within the bell when the nut is screwed on and tightened. For this reason, there are specially shaped contact surfaces designed that will prevent a turning or jamming of the T-head. The T-head inserts into the bell in such a way that it cannot be moved when the nut is tightened while allowing the T-head or better the T-head bolt to be moved while inside the bell so that the nut can easily glide into the fork of the other half brace. Probably the easier way to ensure the absolute secure sitting position of the T-head bolt in the bell of the projecting parts is to shape the T-head bolts or the actual T-heads to fit the shape of the bell. There is also the option to change the shape of the bell and to leave the T-

heads unchanged. This will be addressed in claim 1. It is also possible, that the T-heads and the bells both are changed and shaped to correspond to each other, however, this relates to additional cost to change the form of the bell as well as of the T-head. Important and main focus of the submitted invention is to prevent any possible turning or jamming of the T-head bolts inside the bell by fitting both parts in such a way that after insertion in the bell the T-head can only be moved by turning the T-head bolt but that it otherwise sits absolutely secure.

According to an effective design of the invention it is intended that the T-head is shaped like a wedge and that it fits the bell and also features shaped parts with contact surfaces and that the shaft also features contact surfaces which together avoid a turning motion inside the bell. The shaped parts and the corresponding contact surfaces attach to the surfaces after insertion in such a way that the T-head bolt can be purposefully moved in the specially shaped opening of the bell to allow it to fit over a scaffold element, in other words, a tube, in a safe manner. However, a movement of the T-head bolt within the bell that would be perpendicular to this purposeful movement will be avoided. Thus, the tightening of the nut will always ensure that the T-head bolt sits securely in the bell and cannot be loosened through forceful blows or other sudden movements. In the contrary, a specific shape of the T-head of the T-head bolts

would still contribute to a connection even in the case of an unfortunate incident, meaning an insufficient tightening of the nut so that a fixation of the scaffold element would be achieved. The specially shaped contact surfaces on the shaft also ensure the precise fit of the T-head bolts in the bell without hindering or compromising the pivotal motion.

An especially advantageous shape of the contact surfaces to ensure the secure position of the T-head in the bell would fit the shaped parts to correspond to the free ends of the T-head or to shape those ends. As previously explained, the T-head is the upper end of the T-head bolt which connects with the thread and which is shaped like a T so that there are the so-called free ends of the T-head on the left and right side of the shaft. Those ends of the T-heads have contact surfaces, flat surfaces, while the ends of the commonly known T-heads are rounded. Due to this round shape, the T-heads cannot sit tightly in the bell which however is possible with the aforementioned flat surfaces. Contrary to up-to-date understanding of the matter the T-head bolt can be pivoted back and forth in the corresponding specially shaped opening in spite of the flat contact surfaces and thus make it possible fit over a tubular element.

Further security of the T-head or better the T-head bolt in the bell of the projecting parts can be accomplished by beveling the free ends of the T-head towards the shaft to

form a flat surface. Thus, the T-head or better the entire T-head bolt is pulled into the bell so that the T-bolt and hence the T-head bolt are prevented from jamming when the nut is added and tightened.

Another optimization of the T-head will be accomplished by the fact that the free ends of the T-head feature a short bevel at the back of the T pointing away from the shaft, then a short vertical bevel and finally a longitudinal bevel pointing towards the shaft. Especially the last mentioned longitudinal bevel supports a secure fit in the bell because the free ends of the T-head are now also shaped to fit the special form of the bell or better its limiting walls.

Additional insurance against a jamming or turning of the T-head bolt can be accomplished when the shaft is shaped to feature contact surfaces where it attaches to the head. This shaft, which connects with the lower end or better the edges of the specially shaped opening, prevents a twisting and movement of the T-head bolt within the bell. A specified location and fit of the T-head in the bell make it possible that the nut can be screwed on and tightened without enabling the T-head to move and loosen the set position and tightened fit of the scaffold coupling element.

Previously, it was explained that the free ends of the T-head feature vertical contact surfaces. Additionally, it is intended that the shaft features corresponding contact surfaces as well, so that the shaft in its base features

vertical contact surfaces such as the free ends of the T-head. The contact surfaces would be located vertically towards the longitudinal extension of the T-head.

Also to support an even and quasi controlled insertion of the T-head into the bell, the contact surfaces have limiting edges that are specially formed as bevels to become wider towards the thread. These special edges facilitate the pivotal motion of the T-head bolt in the specified direction, meaning around the longitudinal axis of the T-head.

An especially purposeful shape intends contact surfaces at the free ends of the T-head and at the base of the shaft that are specially shaped. The fact that the securing contact surfaces relate to the actual T-head as well as the base, meaning the shaft, ensures that the secure fit of the T-head bolt is taken care of in two independent areas so that even under unfortunate circumstances a secure fit of the T-head bolts can be guaranteed. This means, that an especially secure-sitting T-head bolt has been designed.

The contact surface at the base ensures a secure measure against turning because it prevents any turning motion of the T-head bolt in the specially shaped opening. An additional safety measure can be achieved by the fact that the contact surfaces in the base of the shaft reach all the way to the fork-shaped free end piece of the closing mechanism when completely inserted. The T-head bolt or

better its shaft will be secured in the area of the specially shaped opening thus in the end zone of the bell as well as in the closing mechanism so that even when maximum pressure is applied a turning movement and a jamming of the T-head bolt would be impossible.

The still necessary pivotal movement of the T-head bolt in the bell, among other actions necessary to insert the shaft in the fork-shaped free end piece of the clamping mechanism, can be guaranteed even with the aforementioned shaping of the contact surfaces because the invention intends for the free end pieces of the T-heads to have slightly flattened supporting surfaces on the side facing the bell. Those slightly flattened supporting surfaces touch the ground or the bottom of the bell which is also slightly flattened at this point so that an exact fit of the T-head can be guaranteed. The necessary pivotal movement of the T-head bolt is therefore possible. Due to the flattened supporting surfaces on both sides, the T-head bolt always slips back into its initial position after the pivotal movement is completed. It does this in such a way, that the corresponding contact surfaces together with the corresponding contact surfaces of the bell guarantee a secure fit of the T-head bolt.

With the correct fit, or better changes, of the T-head bolt and especially of its T-head one addresses the fact that a large number of scaffold coupling elements are

currently in use for which any changes would result in considerable expenditures. Because the invention only calls for a change of the T-head bolts, thus building parts that need to be exchanged in regular intervals anyway, the execution which is so advantageous for the security is possible without being cost prohibitive. It would be of a special advantage if according to the invention the free end pieces of the T-heads on one hand and the bell of the projecting parts on the other hand would be shaped to correspond to each other and preferably feature corresponding contact and supporting surfaces. According to the invention, the specially shaped features are not only implemented on the T-head but also on the bell, therefore both pieces, which naturally would ensure an even higher level of security. Basically, the aforementioned changes on the T-head bolts suffice because they add sufficient security, however, the above referenced solution would be an optimization.

The insertion of the end pieces of the T-head or the entire T-head into the bell according to the invention will be further facilitated by giving the end pieces of the T-head a glide enhancing coating, preferably in the area of the contact and support surfaces. This can be done during the insertion or by adding a coating to the T-heads or better the ends of the T-heads which support the tight position within the bell but also allow for the option to

push the T-head bolts out of the bell when necessary. Actually, it is sufficient if the contact and support surfaces or even only the contact surfaces have a special coating whereas the same effect can be reached if the bell is equipped with corresponding contact surfaces so that a T-head made of hard material can position itself tightly inside.

An especially simple design for an insertion-friendly T-head is to manufacture the ends of the T-head or the entire T-head bolt from a softer material than the material of the half braces. It is conceivable to not use the normally intended galvanized zinc on the corresponding contact surfaces or the ends of the T-heads. Admittedly, this can lead to wear and tear in this area but with a sufficient form and size of the contact surfaces this is no reason to anticipate damage.

Depending on the shape of the bell or the entire scaffold coupling it is possible that the T-head does not slide far enough into the bell. Even though it sits securely due to the invented design and it cannot jam, one cannot rule out the possibility that the scaffold element rests on the back of the T-heads and cannot be correctly tightened. In order to avoid that, the design calls for an indentation on the back of the T-head which is set to correspond with the enclosed scaffold element thus especially with the tube. Even under such unfortunate

circumstances, a secure position of the scaffold element on the back of the T-head can be ensured. It is guaranteed that the scaffold element always sits securely in the coupling.

Especially for the backside of the bell it is functional to add an additional contact surface similar to the contact surface which however expands in a V-shape in the area of the shaft up to the middle of the T-head. This also leaves the pivotal motion unaffected where as a dangerous jamming of the T-head inside the bell can be prevented.

As previously pointed out, there is the possibility to alter the bell of the projecting parts to correspond with the T-heads. Accordingly, the invention allows for an additional functionality so that the bell of the projecting parts in its lowest point is fit for the T-head and equipped with contact surfaces so that a turning or jamming of the T-head bolt during the tightening of the bracing element can be prevented. At the same time, the form of the bell shall ensure that the T-head bolt can still easily be inserted and pivoted as necessary while not being able to jam. Thus, an even securer fit at the time of the tightening of the bracing elements in the bell or better at the lowest point in the bell can be guaranteed.

It is especially useful if the contact and support surfaces are shaped to enclose the ends of the T-head and

the arched surfaces in between. Similar as with the fit of the T-head bolt to the shape of the bell, it is envisioned here inversely that the entire T-head is securely positioned in the lowest point of the bell through a corresponding fit all around while one has to ensure that a pivotal movement around the longitudinal axis of the bolt is possible in order to insert the bracing element. Due to the contact surfaces a turning motion around the longitudinal axis of the T-head will be prevented.

Another useful design intends for the bell to feature contact surfaces just shortly prior to the lowest point in the bell while the corresponding base relates to the thickness of the T-head. Here, the invention intends for the bell to be wide enough to facilitate the insertion of the T-head bolt or the bracing elements. Only with or shortly before reaching the lowest point of the bell, the T-head would be enclosed by the special shape of the bell. This ensures security to prevent turning, or better, jamming.

The special characteristics of this invention are the design of a scaffold coupling element that is safe when shaken, or better, that features secure-sitting head bolts so that work under difficult conditions is possible without the necessity to check the exact fit of each individual T-head bolt. Moreover, the T-heads feature shapes and contact surfaces which correspond with the bell inside the

projecting parts of the appropriate half brace so that adding the nut prevents a damaging turning or jamming of the T-head within the bell. It is not only intended for the ends of the T-heads to feature contact surfaces but also at the base of the shaft, that is in the area where the thread starts so that the shaft rests on the specially formed opening and appropriately also on the fork-shaped end pieces so that a turning or jamming of the T-head can be ruled out. The necessary time, energy and expense to accommodate the changes of the T-head bolts in relation to the immensely improved security is extremely low especially since there are no changes necessary on the existing scaffold coupling elements. Moreover, during the anyway necessary exchange of the T-head bolts one only has to exchange the old version against the new. The level of safety that can be reached with those T-head bolts manufactured according to the new design is higher by a multitude, so that even blows and other pressures under unfavorable conditions cannot influence the tightness of the T-head bolt. It is always securely positioned inside the bell so that even for example strain through shaking motion in the area of train tracks or similar problems will not cause any problems with such scaffolds. In addition to specially shaping the T-head there is also the option to shape the bell of the projecting parts according to the form of the T-head.

Additional details and advantages of the invention can

be gathered in the following description of the corresponding drawing which depicts a preferable design example with the necessary details and individual parts.

You will see on:

- Fig. 1 a scaffold coupling element with half braces that hold a scaffold element on one side with an open half brace, or better, closing mechanism,
- Fig. 2 a T-head bolt in side view,
- Fig. 3 a front view onto the projecting parts with bell,
- Fig. 4 another version of a scaffold coupling element with tilted T-head bolt,
- Fig. 5 a T-head bolt with the clearly depicted special shapes,
- Fig. 6 a T-head bolt with common design with tilted T-head,
- Fig. 7 a scaffold coupling element, cut in the area of the bell and with an inserted T-head featuring specially shaped contact surfaces and a special indentation in the area of the back of the T,
- Fig. 8 a correspondingly shaped T-head bolt in side view, about to scale,
- Fig. 9 an enlarged T-head with specially shaped bevels and the indentation on the area of the

back of the T,

Fig. 10 the T-head bolt in side view with front view of the T-head,

Fig. 11 a front view of the T-head with appropriate indentation,

Fig. 12 a side view of the scaffold coupling element with specially shaped bell,

Fig. 13 a perspective depiction of the scaffold element which shows, or better, clarifies the special shape of the bell.

Fig. 1 shows a scaffold coupling element 1 partially in tightened or braced and pictured also in on open position. Such scaffold coupling elements 1 are used to connect scaffold elements effectively which are positioned at an angle towards each other, or better, to attach them with one another. The half braces 3, 4 are connected with each other and can be moved in a pivotal motion around a bolt 5 whereas on the side opposite of the bolt there is a bracing element 6 to firmly attach the scaffold element 2 after it has been inserted.

There is another half brace 7 which is connected with the half brace 4 so that it can also support a pivotal motion. This half brace is also called a closing mechanism 8 which encloses the scaffold element, which is not shown in this picture, into this composite. The function of a bracing element 6 according to the drawing on figure 1 is

taken by a T-head 12 which allows the T-head bolt 10 a sufficient pivotal movement so that the corresponding scaffold element 2 can be inserted in the remaining or purposefully opened inlet when the half brace 3 is opened.

After loosely inserting the scaffold element 2 the half brace 3 is moved around the bolt 5 towards the half brace 4 and the T-head bolt 10 is moved in a pivotal motion so that the shaft 13 with the thread 14 and the nut 15 can be inserted in the fork-shaped end piece 16 of the half brace 3. The nut 15 is then screwed on so that it moves on the thread 14 and touches the corresponding surfaces of the fork-shaped end piece 16 of the closing mechanism 8. Thus, the scaffold element 2 is tightly enclosed without the necessity of any adjustment or something of that nature because, as detailed later, the T-head 12 sits effectively secure in the bell 26.

This secure fit of the T-head 12 in the bell 26 is possible because the T-head 12 features shaped parts 20, 21 at the end pieces 17, 18 of the T-head 12 which ensure an effectively secure fit inside the bell 26 when the T-head 12 is inserted. The area of the back of the T-head 23 also features shaped parts 22 which make for an arched back of the T 23 which as well ensures optimal stability of the T-head 12 which will be discussed later under the special design of the shaped parts 20, 21.

Figure 2 and later figure 5 clarify that in addition to

the shaped parts 20, 21 there are shaped parts 24 in the area of the shaft 13 specifically at the base 29 on both sides. Those shaped parts 24 reach over the sides 31 of the specially shaped inlet 25 so that the shaft 13 and therefore the T-head bolt in its entirety can no longer be turned or moved therefore preventing a jamming or slipping of the T-head inside the bell.

The shaped parts 20, 21 and also 24 feature even contact surfaces 27, 28 which ensure the secure fit of the T-head 12, or better, the shaft 13, so a crooked insertion of the T-head 12 or jamming can be effectively avoided as described previously.

In addition to the contact surface 28 there is another even contact surface 30 at the base for simple reasons so that the shaft 13 at its base has a square or rectangular shape.

Figure 2 shows such a T-head bolt 10 with the newly created contact surfaces 27, 28 as well as 30. It is also clearly visible that the contact surface 27 or the shapes 20, 21 are shaped so that they form a bevel towards the shaft 13. Thus, it is ensured that the T-head 12 sits securely inside the bell 26 when the T-head bolt 10 is inserted in the bell 26 and the specially shaped inlet 25.

This special feature will be clarified with figure 3 where the beveled surfaces which correspond with the contact surfaces 27 are labeled with 34 and 35. Here, one can also

see the specially shaped inlet 25 which is used to guide in the shaft 13 with the thread 14 while on the bottom of the bell 26 or on the ground of the bell 26 a supporting surface 33 is visible which corresponds to the supporting surface 32 of the end pieces of the T-head 17, 18. When inserting or pulling in the T-head 12 into the bell 26, the supporting surface 32 will rest on the supporting surface 33 so that the person assembling the scaffold elements can identify the optimal position the T-head bolt can be pivoted back into after the scaffold element 2 has been inserted. Now, the nut 15 can be screwed onto the thread 14 so that the scaffold element can be tightened.

Figures 4 and 5 show a scaffold coupling which in principal follows the description in figure 1 through 3, except that here, a slanted sitting T-head bolt 10 is being used because the half brace 3 is shorter than on the version according to figure 1.

In addition, Figure 5 shows the example of the shaped parts 20, 21 as well as 22 and 24, used with the T-head bolt 10, which in turn create the desired contact surfaces 27, 28 thus ensuring a secure fit of the T-head bolt inside the bell 26.

Figure 6 shows a scaffold coupling 1 used to connect two scaffold elements 2, 2' which come together in an angle. One can see that one of the two used T-head bolts 10 features a T-head 12 which sits slanted in the bell 26 and

therefore is able to slip in the correct position as a result of shaking or a sudden blow which then would no longer ensure a safe fixation of the scaffold element 2'.

The here depicted T-head bolt 10 features a T-head 12 with rounded end pieces 17, 18. These rounded end pieces of the T-head 17, 18 are advantageous in the pivotal motion of the T-head bolt 10 inside the bell 26, however, they can lead to a dangerous position of the T-head 12 as shown in figure 6.

Figure 7 shows a scaffold coupling element 1 which already is closed around a scaffold element 2 with both upper half braces 3 and 4. This is accomplished with the aid of the only partially visible T-head bolt 10 where the nut 15 with the base 19 has already been tightened.

The additional half brace 7 also has already been set so that one can see the position of the T-head 12 in the bell 26 at the cross-section of the projecting part 11'. The T-head 12 in this version features quasi layered contact surfaces 27. More detail will be given later in this document. The contact surfaces 28 in the area of the shaft 13 are also especially insertion friendly in their shape since the corresponding edges are beveled. This can be seen especially in figure 9.

The back of the T-head 23 features an indentation 48 to facilitate the insertion of the scaffold element 2 and also to enable the insertion when for some reason the T-head 12 cannot be inserted far enough into the bell. The

indentation 48 corresponds with the outer side of the scaffold element 2 or, better, is fit so that the scaffold element 2 or the corresponding tube can also rest on the T-head 12.

Figure 8 clarifies such a T-head bolt 10 where you not only can see the indentation 48 in the area of the back of the T but also the layered shape of the contact surfaces 27.

This special shape of the contact surfaces 27, or better the end pieces of the T-head 17 and 18 are clearly visible on figure 9 where you can clearly see that there first is a bevel 38 in the direction of the back of the T 23 which becomes a short vertical 39 and connects into a longitudinal bevel 40 so that the safe and tight position of the T-head 12 in the bell 26 can be achieved as previously mentioned at multiple times. In addition, the edges 42, 43 in the area of the shaft 13 or at the base of the shaft 13 are beveled 44, 45 and expand towards the shaft 13. This basically forms some type of wedge which is supposed to facilitate the exact insertion and tightening of the T-head 12 in the bell 26, and it really does.

Figure 10 shows the shape of the bevel 38, the vertical 39 and the longitudinal bevel 40 in the area of the end pieces of the T 17,18 which facilitates the insertion into the bell 26 through the previously mentioned bevels 44, 45, 45' or better, the edges 42, 43 , 43' .

Figure 11 shows a front view of the back of the T 23 of

the T-head 12 where the hollow-like indentation 48 is visible as well as the specially shaped parts of the bevels 38 at the end pieces of the T 17 and 18. In addition, you can see the leveled pieces 47 along the edges of the T-head 12 which altogether allow for an optimal shape to insert and tighten the T-head 12.

Figure 12 and 13 clarify the special version of the scaffold element after which the bell 26 in the projecting parts 11 is fit to correspond to the shape of the T-head 12. In the side view of the scaffold coupling 1 one can see the bell 26 and the the lowest point of the bell which is especially shaped to fit the T-head 12 with its contact surfaces 27'. Since the continuation of the lowest point in the bell, which is open to allow the shaft 13 of the T-head bolt to be inserted, also features a contact surface 28', the desired fixation of the closing element 6 in the bell 26 or better, in the projecting parts 11 can be achieved. In addition, the lowest point of the bell 55 is fit to the arched surfaces 56 resulting in specific contact surfaces 32'.

Especially in figure 13, it is shown that the bell 26 features parts 58 towards its lowest point 55 after which the special fit for the T-head 12 follows, meaning only after this point there are contact surfaces 27', 32' designed to facilitate the insertion of the T-head bolt but to also facilitate the specific loosening of the T-head

bolt.

All mentioned characteristics, as well as the features shown on the drawings are either by themselves or in combination essential to this invention.

Patent Claims

1. Scaffold coupling element for tubular scaffold elements (2) featuring two half braces (3, 4) which can be attached around the scaffold element (2) and pivot around a bolt (5). A closing element (6) tightens the braces (3, 4) and connects them with and additional brace (7) or a pair of braces which hold a second scaffold element. The closing element (6) consists of T-head bolts (10) which are held by bell-shaped projecting parts (11) limiting the pivotal motion of the T-heads (12). The shaft (13) with the thread (14) and the nut (15) fit into the fork-shaped, free end piece (16) of the corresponding brace (7) which functions as a closing mechanism (8),

characterized by the fact

that the T-head (12) of the T-head bolts (10) is designed to fit the bell (26) of the projecting parts (11) and by adding contact surfaces (27) to avoid jamming inside the bell (27) or turning during the tightening of the bracing elements (6) while allowing a pivotal motion.

2. Scaffold coupling element according to claim 1, **characterized by the fact** that the T-head (12) is shaped like a wedge and that it fits the bell (26) and also features shaped parts (20, 21, 22; 24) with contact surfaces (27) and that the shaft also features contact surfaces (28) which altogether avoid a turning motion inside the bell (26).

3. Scaffold coupling according to one of the
aforementioned claims,
characterized by the fact
that the shaped parts (20, 21) are fit to correspond to the
free ends of the T-head (17,18) or to shape those ends.

4. Scaffold coupling according to one of the
aforementioned claims,
characterized by the factthat the free ends of the T-head
(17, 18) are beveled towards the shaft (13) and form a flat
surface.

5. Scaffold coupling according to claim 4,
characterized by the fact
that the free ends of the T-head (17, 18) feature a short
bevel (38) at the back of the T (23) pointing away from the
shaft (13), then a short vertical bevel (39) and finally a
longitudinal bevel (40) pointing towards the shaft (13).

6. Scaffold coupling according to one of the
aforementioned claims,
characterized by the fact
the shaft (13) is shaped to feature contact surfaces (24)
where it attaches to the head (29).

7. Scaffold coupling according to one of the
aforementioned claims,
characterized by the fact
that the shaft (13) in its base (29) features vertical
contact surfaces (28) such as the free ends of the T-heads

(17, 18). The contact surfaces (28) would be located vertically towards the longitudinal extension of the T-head (12) or the shaft (13).

8. Scaffold coupling according to claim 5,
characterized by the fact
that the contact surfaces (28) have limiting edges (42, 43) that are specially formed as bevels (44, 45) to become wider towards the thread (14).

9. Scaffold coupling according to one of the
aforementioned claims,
characterized by the fact
that the contact surfaces (27, 28) at the free ends of the T-head (17, 18) and at the base (29) of the shaft (13) are specially shaped

10. Scaffold coupling according to one of the
aforementioned claims,
characterized by the fact
that the contact surfaces (28) in the base (29) of the shaft (13) reach all the way to the fork-shaped free end piece (16) of the closing mechanism (8) when completely inserted.

11. Scaffold coupling according to one of the
aforementioned claims,
characterized by the fact
that the free end pieces of the T-heads (17, 18) have slightly flattened supporting surfaces (32) on the side facing the bell (26).

12. Scaffold coupling according to one of the
aforementioned claims,

characterized by the fact

that the free end pieces of the T-heads (17, 18) on one hand
and the bell (26) of the projecting parts (11) on the other
hand would be shaped to correspond to each other and
preferably feature corresponding contact and supporting
surfaces (27, 28, 32, 33).

13. Scaffold coupling according to one of the
aforementioned claims,

characterized by the fact

that the end pieces of the T-head (17, 18) feature a glide
enhancing coating, preferably in the area of the contact and
support surfaces (27, 28, 32).

14. Scaffold coupling according to one of the
aforementioned claims,

characterized by the fact

that the ends of the T-heads (17, 18) or the entire T-head
bolts (10) are made from a softer material than the material
of the half braces.

15. Scaffold coupling according to one of the
aforementioned claims,

characterized by the fact

that there is an indentation (48) on the back of the T-head
(23) which is set to correspond with the enclosed scaffold
element (2).

16. Scaffold coupling according to claim 7,
characterized by the fact
that an additional contact surface (30) is intended similar
to the contact surface (28) but which expands in a V-shape
in the area of the shaft (13) up to the middle of the T-head
(12).

17. Scaffold coupling according to claim 1,
characterized by the fact
that the bell (26) of the projecting parts (11) in its
lowest point (55) is fit for the T-head (15) and equipped
with contact surfaces (27') to that a turning or jamming of
the T-head bolt (10) during the tightening of the bracing
element (6) can be prevented.

18. Scaffold coupling according to claim 17,
characterized by the fact
that the contact and support surfaces (27' , 28' , 32') are
shaped to enclose the ends of the T-head (17, 18) and the
arched surfaces (56) in between.

19. Scaffold coupling according to one of the
aforementioned claims,
characterized by the fact
that the bell (26) to feature contact surfaces (27' , 28' ,
32') just shortly prior to the lowest point in the bell (55)
while the corresponding base (58) relates to the thickness
of the T-head (12).

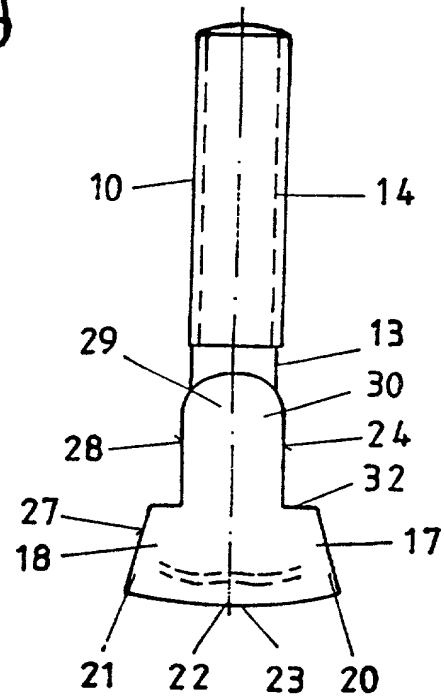
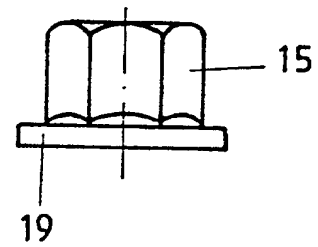
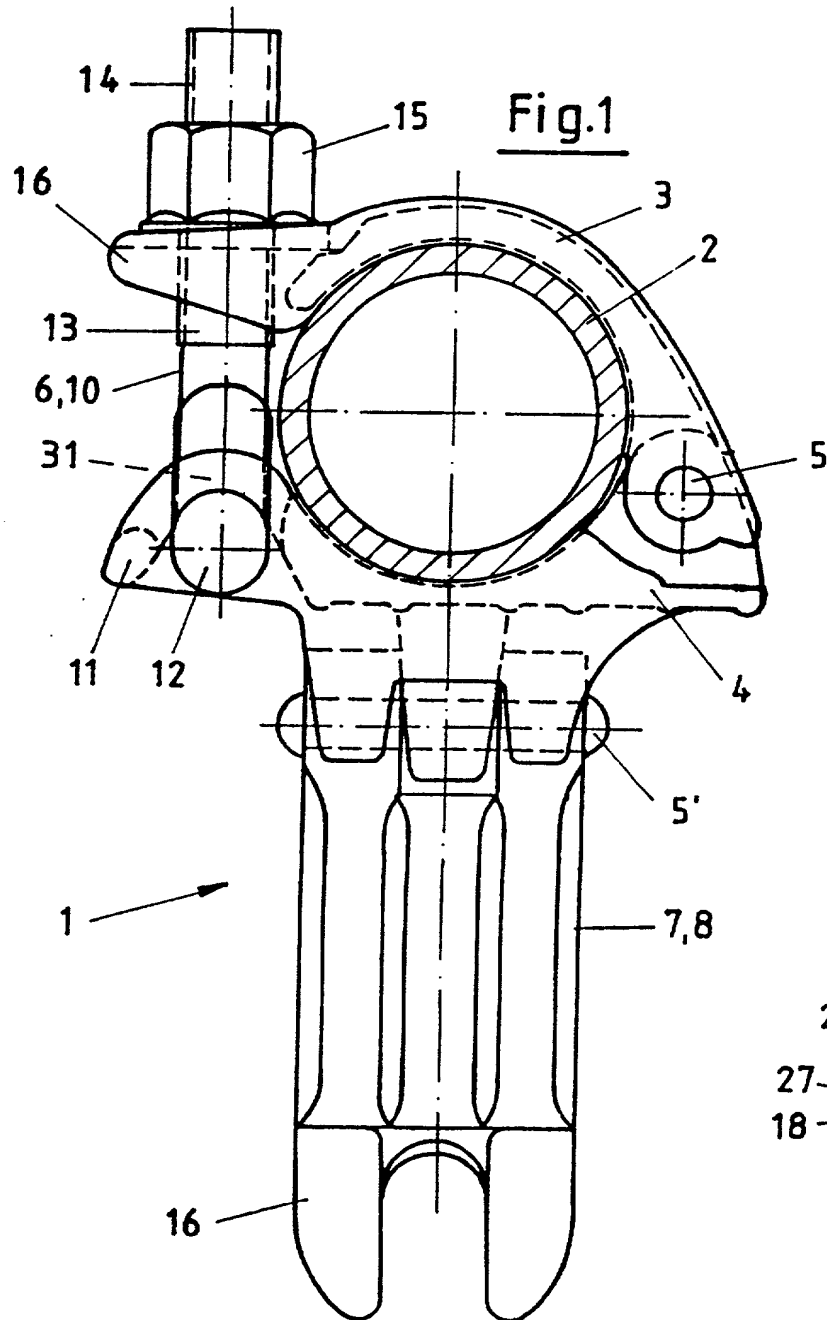
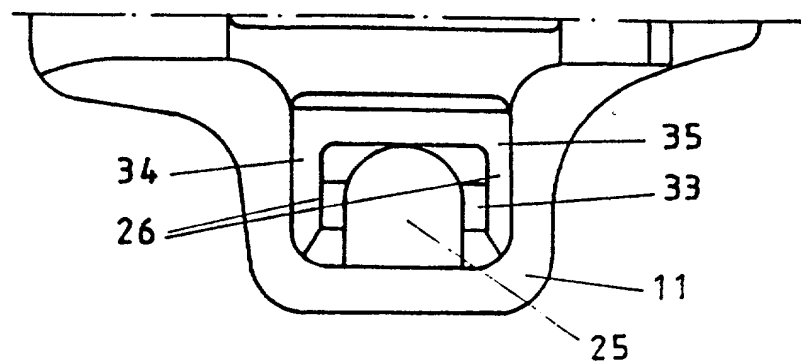


Fig.3



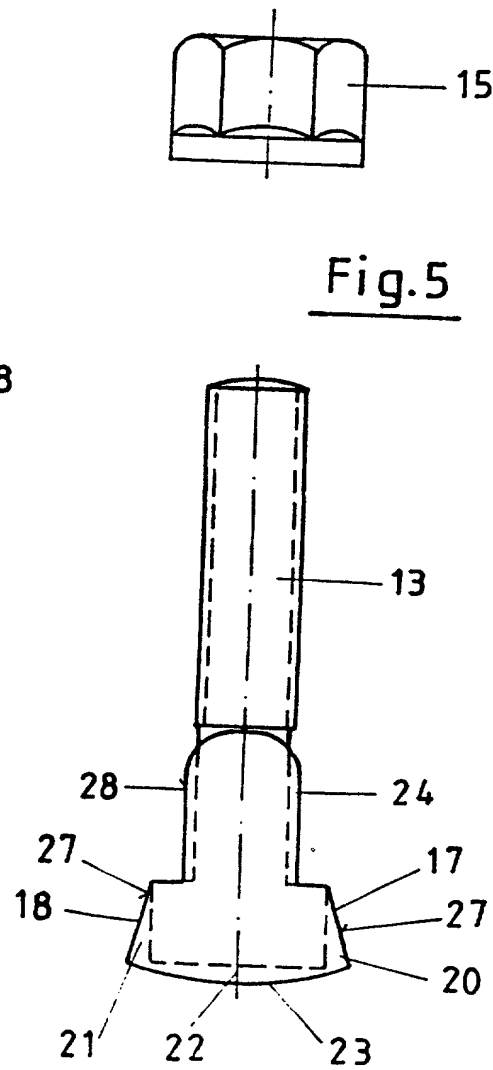
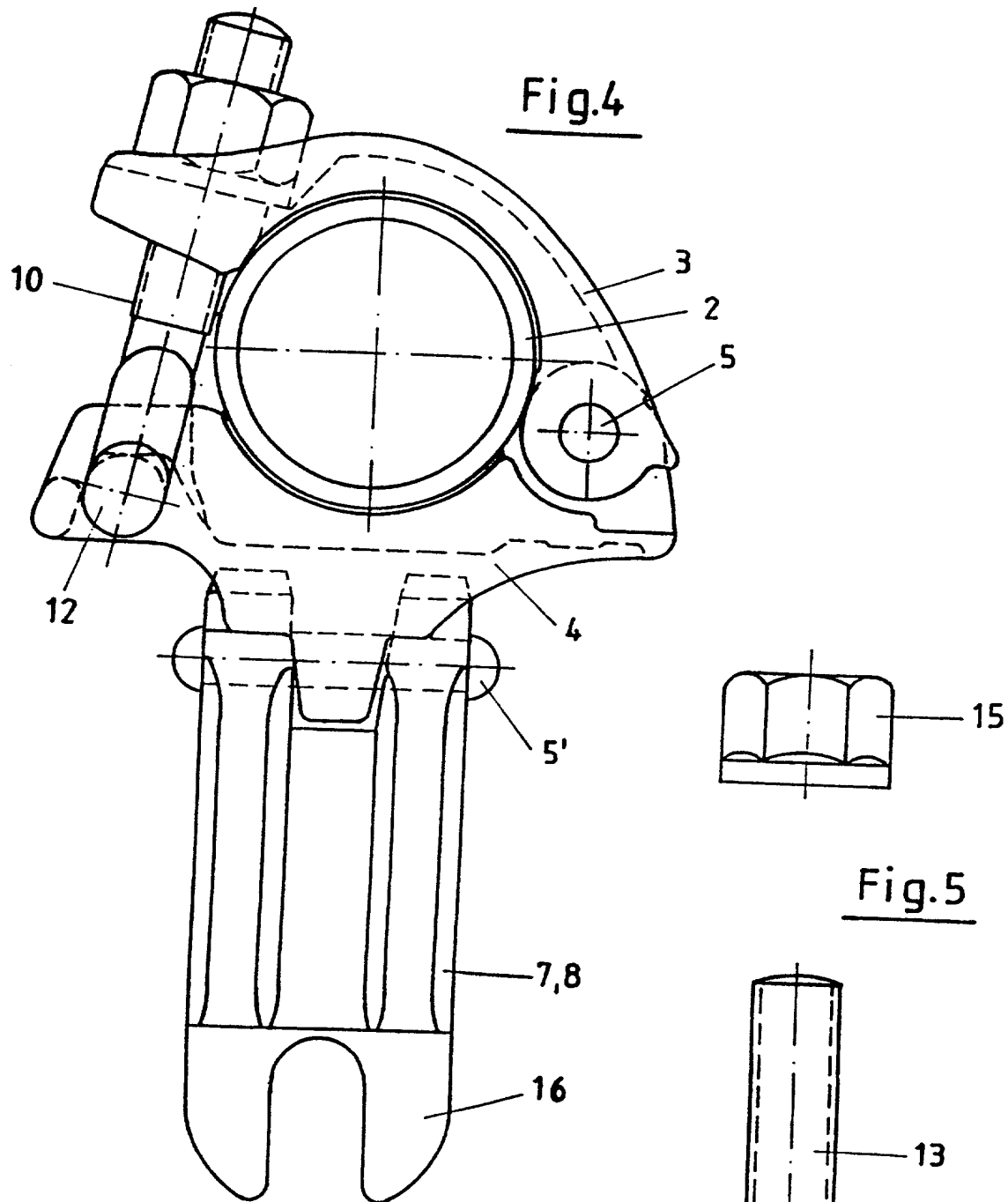
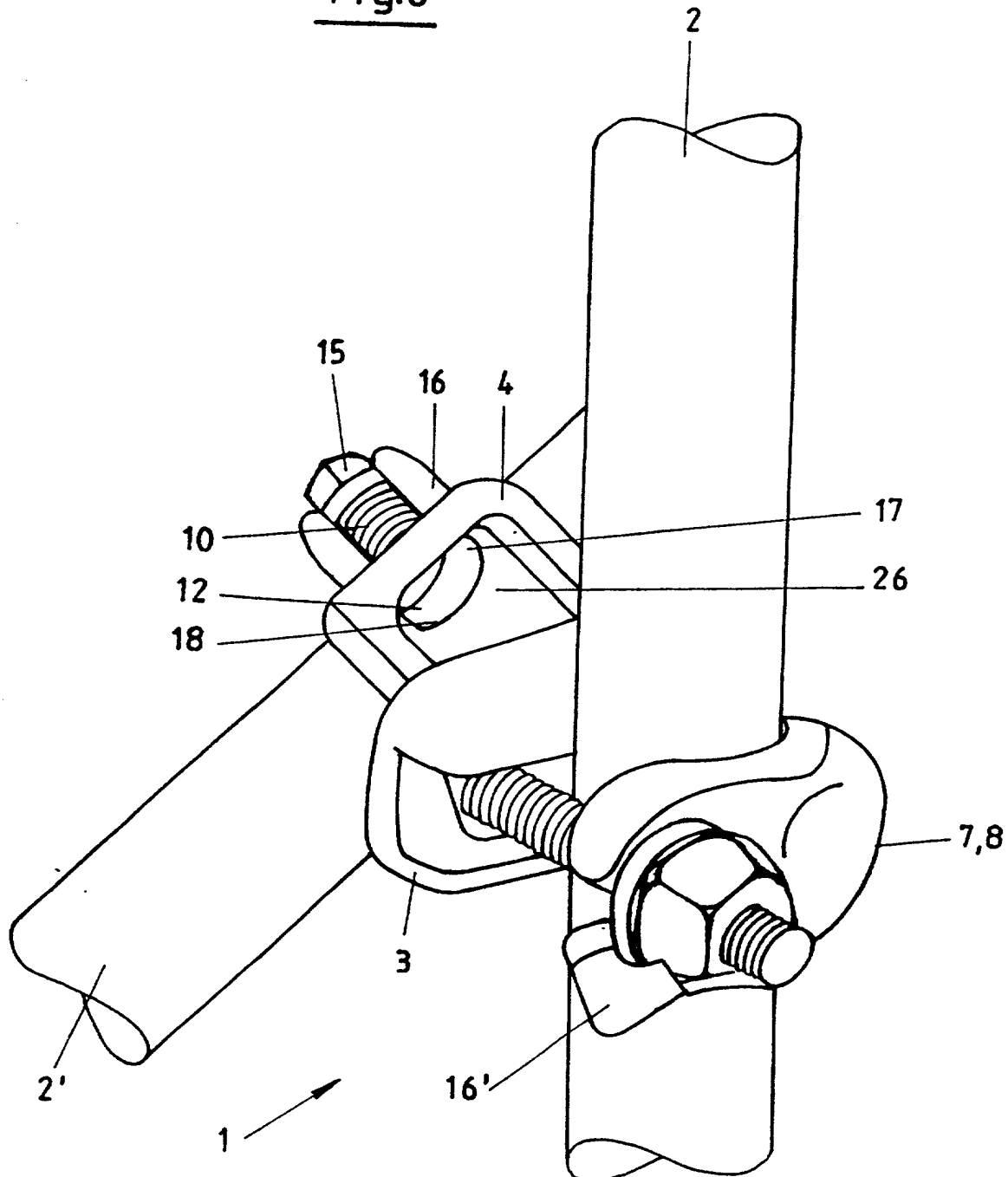
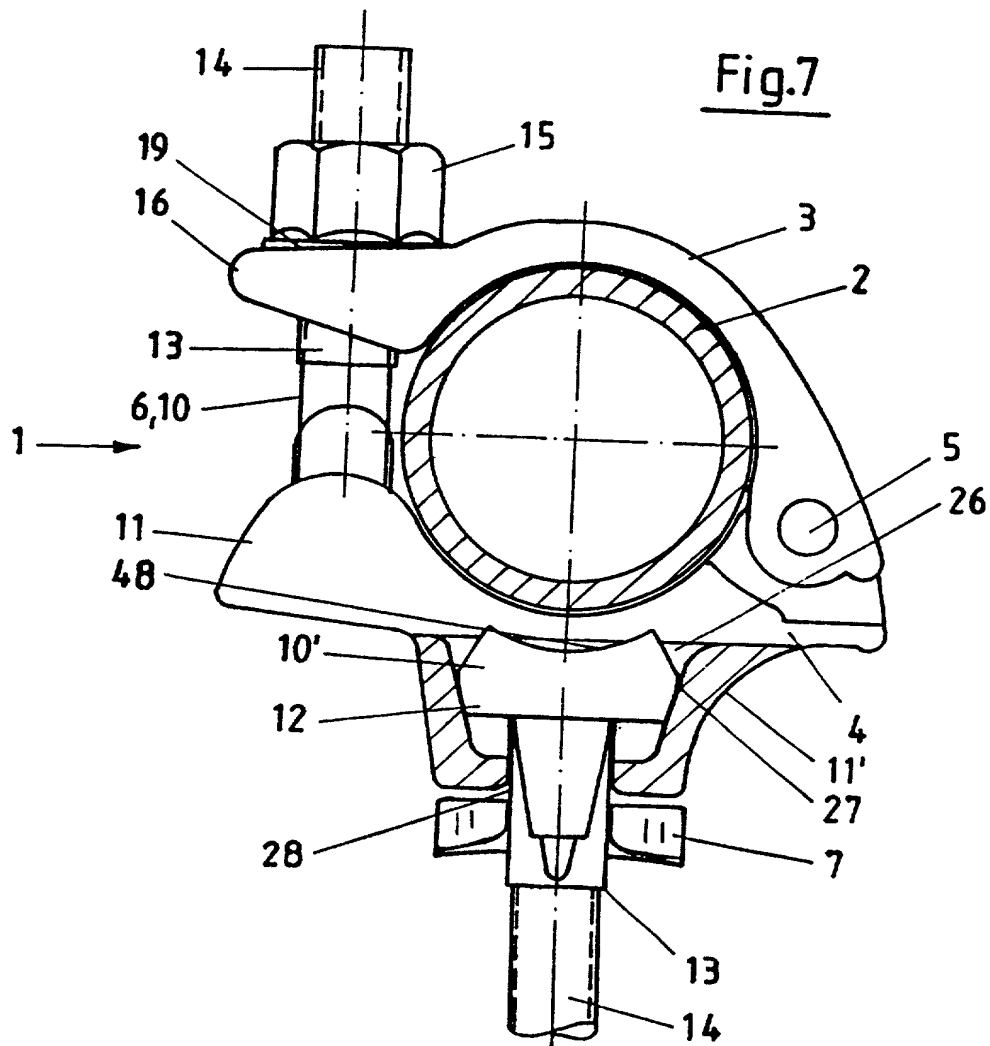


Fig.6





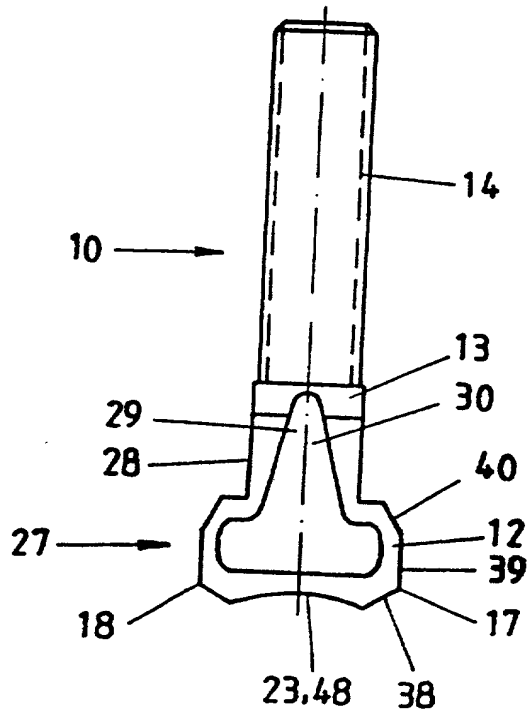


Fig.8

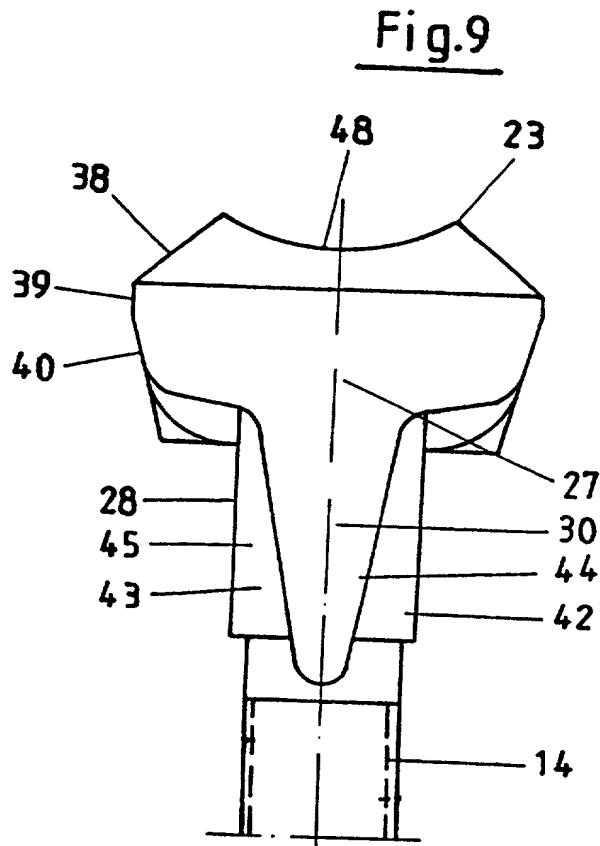


Fig.9

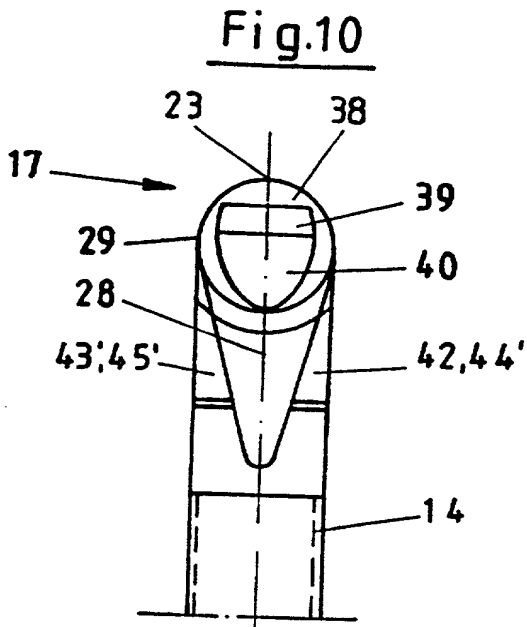


Fig.10

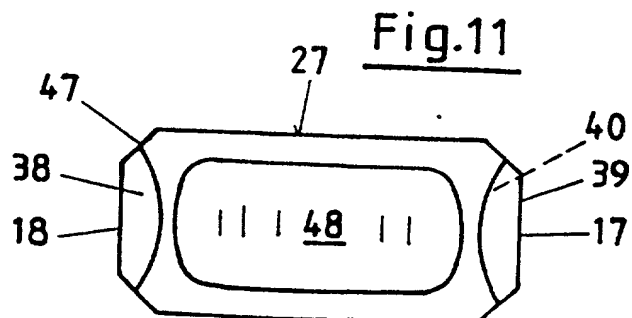


Fig.11

Fig.12

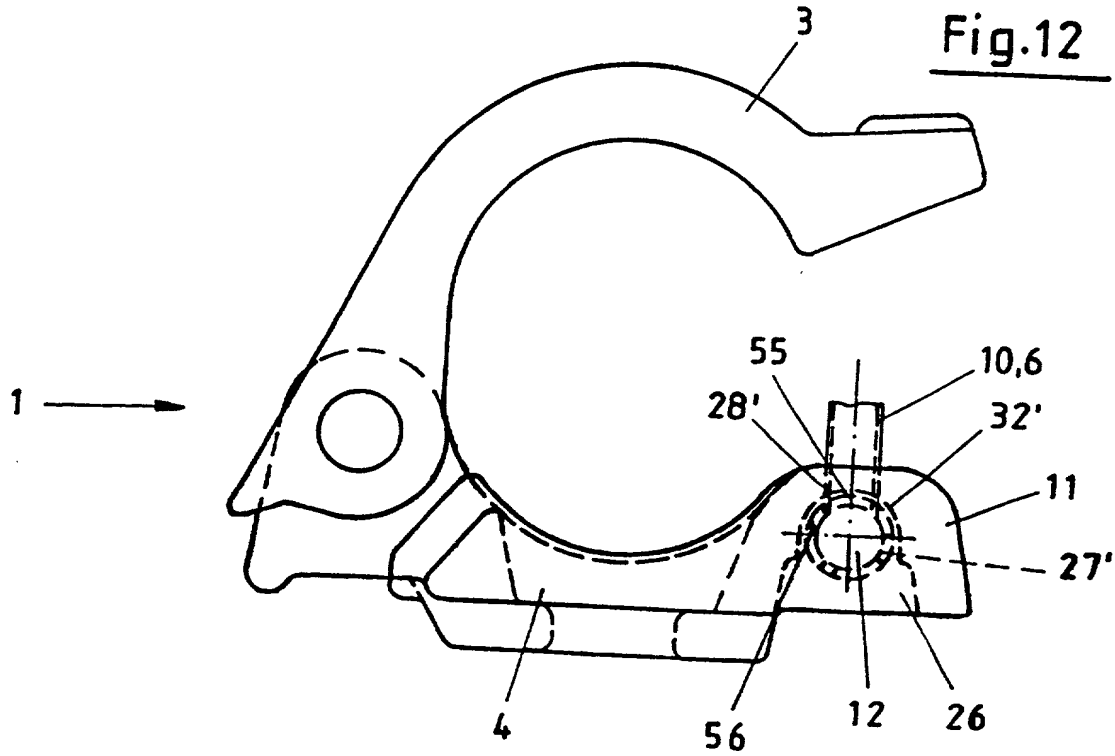
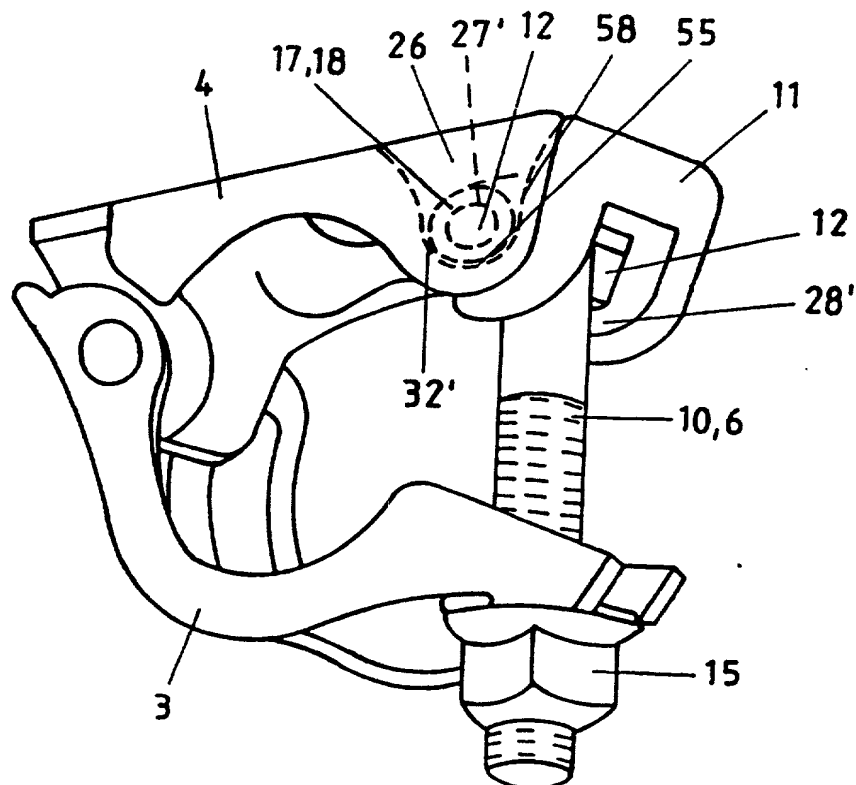


Fig.13



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OR
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Submitted after Initial
Filing (surcharge
(37 CFR 1.16 (e))
required)

Attorney Docket Number SCHULTE

First Named Inventor MIEDEN

COMPLETE IF KNOWN

Application Number /

Filing Date 02/21/2001

Group Art Unit

Examiner Name

As a below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Scaffold Coupling Element with a Secure-Sitting Head Bolt

(Title of the Invention)

the specification of which

☒ is attached hereto

OR

☐ was filed on (MM/DD/YYYY)

as United States Application Number or PCT International

Application Number

and was amended on (MM/DD/YYYY)

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES NO	
198 37 970.6	Germany	08/21/1998	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
199 26 231.4	Germany	06/10/1999	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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NAME OF SOLE OR FIRST INVENTOR :

☐ A petition has been filed for this unsigned inventor

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Family Name Mieden
or Surname

Inventor's
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First Named Inventor

MIEDEN

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Name

Johannes-Albert MIEDEN

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